IntelliPort II / IntelliPort II EXpandable

Hardware Reference Guide

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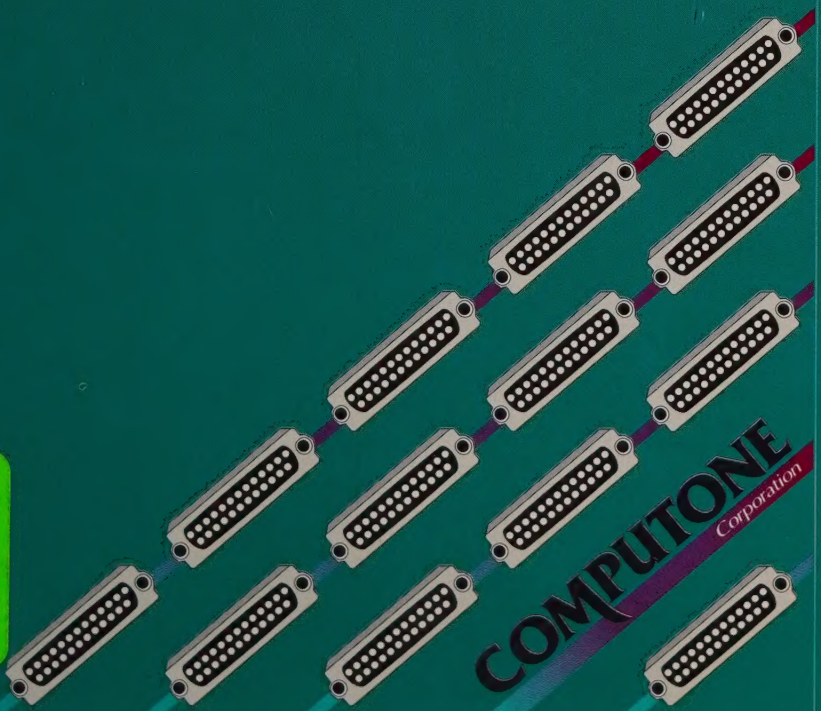

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IntelliPort II
Hardware Reference Guide

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The *IntelliPort II Hardware Reference Guide* describes the IntelliPort II and IntelliPort II EXpandable line of multi-port serial products. This manual also covers installation and troubleshooting procedures.

Who Should Use It

This manual is intended for people who are installing IntelliPort II products and connecting serial devices. System administrators should read the Software Reference Guide provided with the IntelliPort II software drivers.

If you are installing an IntelliPort II hardware product, you should know how to install hardware in your system (ISA, EISA, or Micro Channel). You may also find it helpful to understand basic system administration tasks on the operating system you are using.

Chapter Summary

The *IntelliPort II Hardware Reference Guide* consists of the following chapters:

Chapter 1 - Introduction
Briefly describes the IntelliPort II product line.

Chapter 2 - Installation
Provides system requirements and detailed instructions for installing IntelliPort II products in ISA, EISA, and Micro Channel systems.

Chapter 3 - Cabling
Describes Computone cable accessories and provides wiring diagrams for connecting IntelliPort II ports to terminals, PCs, modems, and printers.

Chapter 4 - IntelliPort II Expansion Modules
Describes the controls and menus available on the IntelliPort II EXpandable expansion modules.

Appendix A - Hardware Configuration Log
A form on which you can write down IRQs and I/O addresses assigned to your IntelliPort II products for future reference.

Appendix B - I/O Address Considerations
Describes EISA I/O addressing and provides a complete list of available I/O addresses for ISA systems.

This manual also includes an index.

Terminology

This manual uses the following terminology:

Controller	The adapter that you install inside your host system. Also referred to as *board*.
EISA	Acronym for Extended Industry Standard Architecture. A 32-bit bus design that is downward-compatible with the ISA (PC-AT) bus hardware.
Expansion Module	Part of the IntelliPort II EXpandable system, the expansion module includes 8 or 16 ports, an LCD display, and a three-button control panel. You can connect up to four expansion modules to a single controller for a total of up to 64 ports.
Expansion Box	Part of the standard IntelliPort II system, the expansion box is an external RS-232 interface with either DB-25 or RJ-45 connectors.
Host	The ISA, EISA, or Micro Channel system in which you install the IntelliPort II.
IntelliPort II EXpandable	The modular, expandable line of IntelliPort II products. You can initially purchase 8 or 16 ports, and expand to a maximum of 64 ports per controller as needed.
Interface Module	A generic term that refers to both expansion modules and expansion boxes.

ISA	Acronym for Industry Standard Architecture. The 16-bit bus design found in IBM PC-AT and compatible computers.
PC	Acronym for Personal Computer; refers to any ISA, EISA, or Micro Channel system. In this manual, *PC* is interchangeable with the term *host.* ("PC" is somewhat of a misnomer in this manual, since most IntelliPort II products are installed in multi-user systems.)
Serial Device	Any external RS-232 compatible device that you might attach to an IntelliPort II port. The most common examples are terminals, printers, plotters, modems, point-of-sale (POS), data collection devices, bar code scanners, industrial machinery, and so on.
Standard IntelliPort II	The IntelliPort II products that provide a fixed number of ports (4, 8, or 16 ports, depending on the model).

Chapter 1
Introduction

This chapter provides general information about Computone's IntelliPort II line of multi-port serial products. This chapter covers the following topics:

- Product overview
- IntelliPort II (standard)
- IntelliPort II EX (expandable)

Product Overview

The IntelliPort II is a line of high-speed multi-port asynchronous communications products. The IntelliPort II line lets you connect nearly any serial device to a system, including:

- Terminals
- Printers and plotters
- Modems
- Point-of-sale (POS) devices, including cash registers
- Data collection devices, including bar code readers
- Industrial devices with RS-232 interfaces

IntelliPort II products can operate at sustained data rates of up to 115,200 bps and are available for ISA (AT-compatible), EISA, and Micro Channel™ (MC) bus architectures.

The standard IntelliPort II products support 4, 8, or 16 ports, and are not expandable. The IntelliPort II EXpandable supports from 8 to 64 ports, expandable in multiples of 8 or 16 with a maximum of four expansion modules per concentrator. Figure 1-1 illustrates the IntelliPort II line.

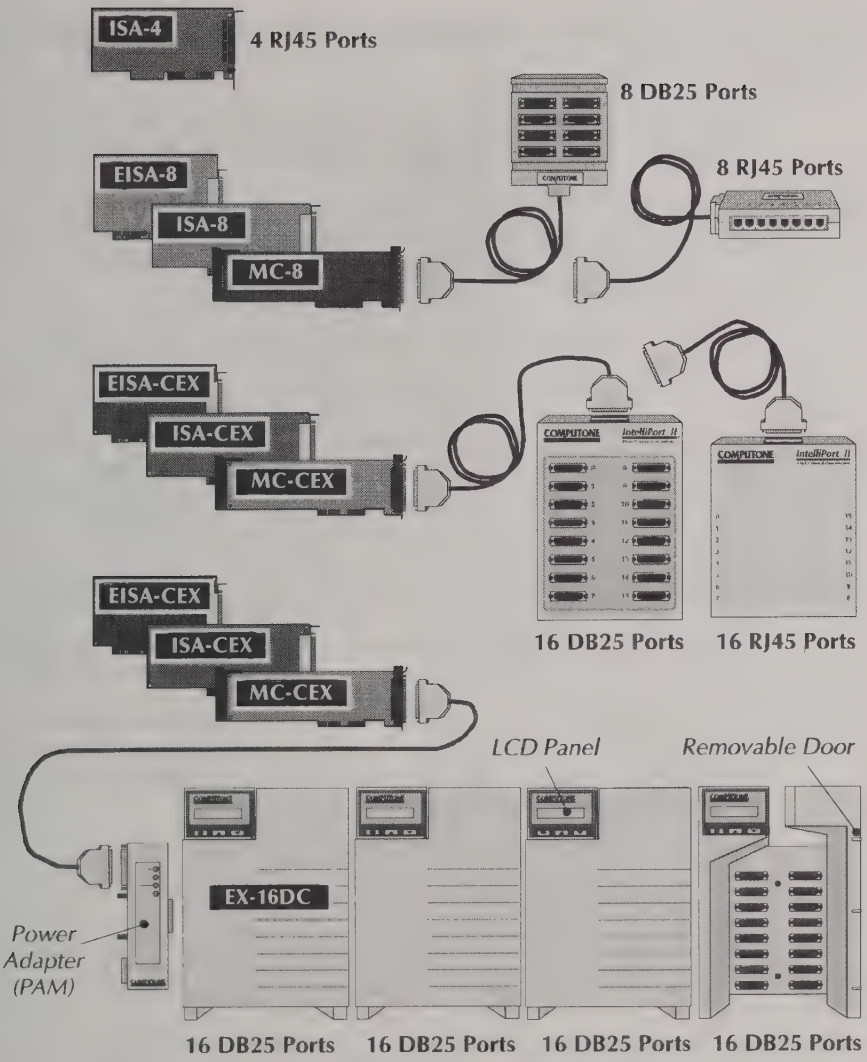


Figure 1-1. IntelliPort II Product Line

The following sections describe the standard IntelliPort II and IntelliPort II EXpandable products in further detail.

Standard IntelliPort II

The standard IntelliPort II supports 4 to 16 asynchronous serial connections. Figure 1-2 shows a typical application for the standard IntelliPort II.

IntelliPort II products are available for ISA, EISA, and Micro Channel architectures. You can install ISA controllers in ISA or EISA systems. Table 1-1 shows what IntelliPort II products are available by number of ports, port type, and bus type.

Table 1-1. Standard IntelliPort II Products by Port and Bus Type

	4 ports	8 ports		16 ports	
Bus Type	**RJ-45**	**RJ-45**	**DB-25**	**RJ-45**	**DB-25**
ISA	ISA-4R	ISA-8R	ISA-8D	ISA-F16R	ISA-F16D
EISA		EISA-8R	EISA-8D	EISA-F16R	EISA-F16D
Micro Channel		MC-8R	MC-8D	MC-F16R	MC-F16D

The 4-port model is an adapter with four built-in 8-pin RJ-45 connectors. The 8-port and 16-port versions consist of two parts: a controller and an interface module. The interface modules are available with either DB-25 (female) or RJ-45 connectors.

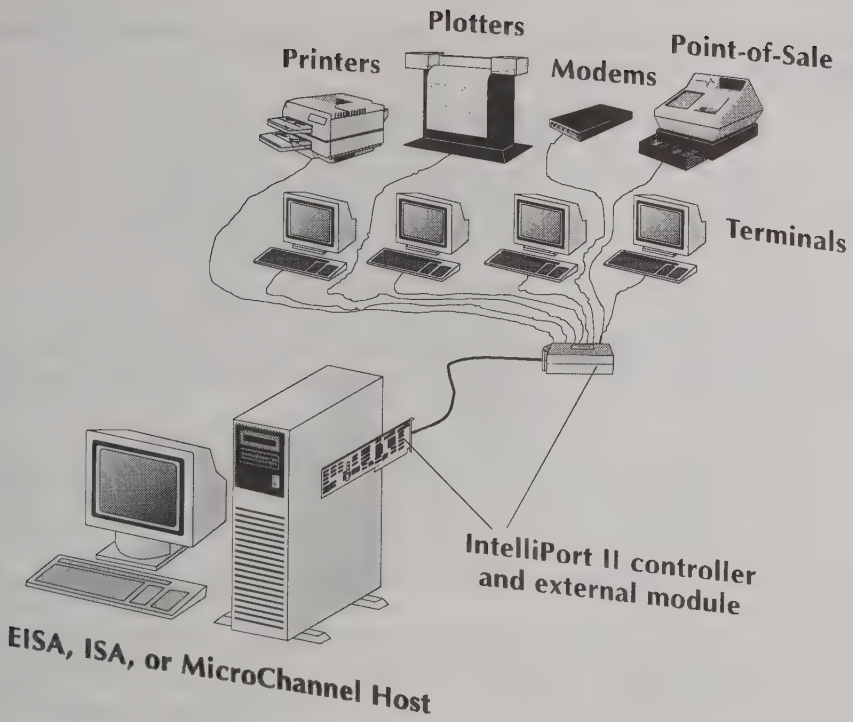


Figure 1-2. Example IntelliPort II Application

IntelliPort II EXpandable

The IntelliPort II EXpandable is a scalable multi-port system that is designed for both intermediate and large-scale applications. Its modular design lets you purchase the capacity you need now, then add more ports (in multiples of 8 or 16) in the future. Each controller supports from 8 to 64 serial devices. Figure 1-3 shows a typical application for the IntelliPort II EXpandable.

The IntelliPort II EXpandable products consist of the following:

- An intelligent, high-performance communications controller (adapter). Controllers are available for ISA (AT-compatible), EISA, and Micro Channel architectures.

- One to four expansion modules. An expansion module is an intelligent I/O manager that provides 8 or 16 RS-232 serial connections. For more information, see Chapter 4, "IntelliPort II Expansion Modules."

Table 1-2 summarizes the available IntelliPort II EXpandable products.

Table 1-2. IntelliPort II EXpandable Products by Port and Bus Type

Bus Type	Controller	Expansion Modules	
		8 DB-25	16 DB-25
ISA	ISA-CEX	EX-8DC	EX-16DC
EISA	EISA-CEX	EX-8DC	EX-16DC
Micro Channel	MC-CEX	EX-8DC	EX-16DC

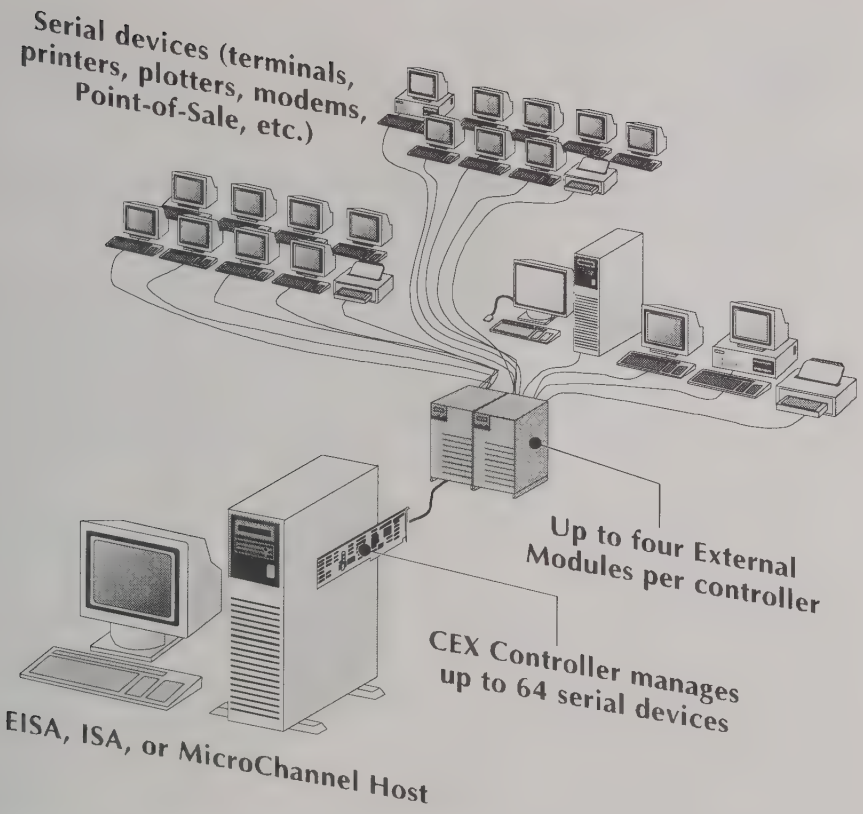


Figure 1-3. Example IntelliPort II EX Application

Chapter 2
Installation

This chapter describes the hardware installation procedures, and covers the following topics:

- Before you start
- IRQ and I/O addresses
- ISA controller configuration
- EISA controller configuration
- Micro Channel controller configuration
- Installing the controller
- Connecting external modules

Before You Start

Overall, installing an IntelliPort II is a two-part process: installing the IntelliPort II hardware, and installing and configuring the software device drivers for your operating system. Depending on the operating system you are using, these two parts may be somewhat interrelated.

This manual covers only the hardware installation procedures. The complete installation procedure depends on your host operating system.

Software Dependencies

> **Important**: Before you begin installation, read the manuals and Release Notes supplied with your IntelliPort II drivers. This documentation contains all the details discussed in this section.

The IntelliPort II works under several different operating systems. Different operating systems have different requirements for IntelliPort II installation. These include the following:

- **Installation order.** Some systems require you to install the drivers first; other systems require you to install the hardware first.
- **Number of IntelliPort II controllers in a system.** The driver software may limit the total number of IntelliPort II controllers in the system.
- **Number of ports supported.** The IntelliPort II EX hardware supports up to four expansion modules per controller, for a total of 64 ports. Some systems may impose stricter limits; for example, some device drivers support up to 32 ports.
- **IRQ (interrupt) selection.** Some operating systems require multiple IntelliPort II controllers to share one IRQ; others require a unique IRQ for each controller. Some operating systems poll the controller and do not use an IRQ at all.
- **ISA and EISA controllers in one system.** Systems that require a unique IRQ for each IntelliPort II controller allow both ISA and EISA controllers in one system. Other systems require that all IntelliPort II controllers be either all ISA or all EISA.

System Resources

This section explains the system resources required by the IntelliPort II.

System Memory

The IntelliPort II uses I/O mapping and does not use any memory address space.

DMA Channels

The IntelliPort II does not use any DMA channels.

IRQ

You can configure the IntelliPort II to use IRQ 3, 4, 5, 7, 10, 11, 12, or 15. Some device drivers do not use interrupts, some require a unique interrupt for each IntelliPort II controller, and others require that you use the same interrupt for all controllers. See your driver software manuals and release notes for more information.

EISA and Micro Channel systems have a system configuration utility that assigns an IRQ to the controller. The IRQ assigned by the configuration utility must match the IRQ specified by the driver.

ISA systems set the IRQ through the driver software when the operating system boots.

The IntelliPort II can use one of eight IRQs. Table 2-1 lists the valid IRQs for the IntelliPort II, and what other hardware may make use of them.

Table 2-1. IRQs Supported by IntelliPort II

IRQ	Typical use
3	Serial port #2
4	Serial port #1
5	Parallel port #2
7	Parallel port #1
10	**Usually available**
11	**Usually available**
12	Bus mouse
15	Second disk controller

I/O Addresses

The computer uses I/O addresses to communicate with peripheral devices. Each IntelliPort II controller requires a block of eight I/O addresses. You specify the location of the block with the *base I/O address* (the lowest I/O address in the block).

Depending on the hardware architecture (ISA, EISA, or Micro Channel), the system assigns a group of I/O addresses to the IntelliPort II controller, as follows:

- EISA systems use a unique range of I/O addresses based on the slot in which you install the controller.
- Micro Channel systems have a system configuration utility that assigns I/O addresses to the controller. You choose a base I/O address from a list, and the utility automatically reports any conflicts.
- ISA systems require you to manually assign the base I/O address by setting a bank of switches on the controller. (If you install an ISA controller in an EISA system, you must set the switches on the controller based on the I/O address provided by the EISA configuration program. The EISA installation utility shows you a picture of how you should set the controller switches for the assigned I/O address.)

Depending on the order of installation, you may already have specified an I/O address. See your driver manuals and release notes for more information.

Installing in an ISA System

Installing the IntelliPort II controller in an ISA system consists of three major steps:

1. Selecting an IRQ and base I/O address for the controller.

2. Setting the I/O address switches (SW1 through SW7). Make sure switch SW8 is ON. (Setting SW8 OFF selects 8-bit I/O, which is very rarely required.)

3. Installing the IntelliPort II controller in your system and connecting interface modules or expansion modules to the controller.

If you are installing an ISA controller in an EISA system, read the "EISA Installation" section.

Selecting the IRQ

In ISA systems, the IntelliPort II drivers set the controller's IRQ during system initialization. If you have already installed the drivers, you should have already selected the IRQ and written it down in the Hardware Configuration Log in Appendix A.

If you are installing the controller first, skip to the section "Setting I/O Address Switches." You determine the IRQ while installing the drivers.

Setting I/O Address Switches

On the IntelliPort II ISA controllers, a block of eight DIP switches determine the I/O address. Figure 2-1 shows the location of the switches on the ISA-8 controller. The switches are in a similar location for all IntelliPort II ISA controllers.

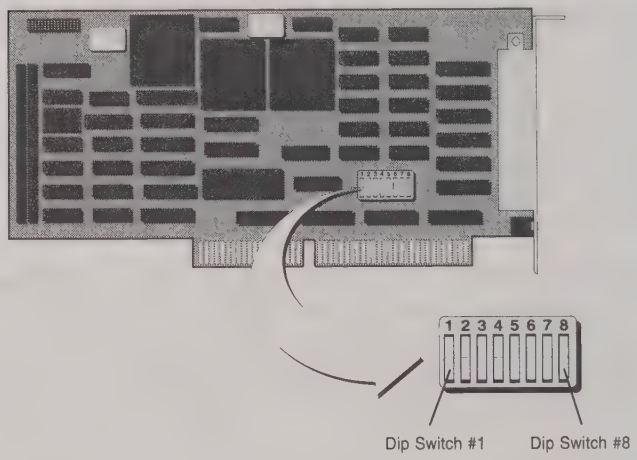


Figure 2-1. Location of I/O address DIP switches (ISA)

To determine which base I/O address to use, follow these steps:

1. If you have already installed the drivers, you should have already selected the I/O address and written it down in the Hardware Configuration Log in Appendix A. In this case, set the switches to correspond to the I/O address as shown in Table 2-2 or Appendix B.

2. If you install the hardware first, you can pick any free I/O addresses. Use one of the settings from Table 2-2, unless this conflicts with other hardware or drivers installed in your system. The factory default I/O address is 308h. Write down the selected I/O address in the Hardware Configuration Log in Appendix A.

   For a complete listing of I/O addresses, see Appendix B, "I/O Address Considerations."

Table 2-2. Commonly Available I/O Address Switch Settings (ISA)

I/O Addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
308 - 30F	off	off	on	on	on	on	off	on
310 - 317	off	off	on	on	on	off	on	on
318 - 31F	off	off	on	on	on	off	off	on
320 - 327	off	off	on	on	off	on	on	on

Installing the ISA Controller

To install the IntelliPort II ISA controller in your system, follow these steps:

1. Power OFF the system.

> **Important**: DO NOT attempt to install the controller while the system is powered ON. If you do, you can damage both the controller and the system.

2. Remove the cover from your system. If you are not sure which screws secure the cover, follow the instructions in the manual that came with your computer.

3. Install the controller in any available 16-bit slot. Make sure the controller does not touch components, such as SIMMs or other high-profile parts, on the motherboard or other adjacent hardware.

4. Replace the system cover.

After installing the controller, proceed to the section "Connecting Interface Modules" for standard IntelliPort II controllers or "Connecting Expansion Modules" for IntelliPort II EXpandable controllers.

Installing in an EISA System

The procedure for installing an EISA or ISA IntelliPort II controller in an EISA system consists of two major steps:

1. Run the EISA Configuration program supplied with your computer.

   If you are installing an ISA controller in an EISA system, you must set the I/O address switches (SW1 through SW7) to match the I/O address supplied by the EISA Configuration program. Set switch SW8 to ON.

2. Install the IntelliPort II controller in your system and attach external modules as needed.

➡ **Note:** If you remove or replace the system battery, configuration information is lost. To restore the configuration, boot the system from the backup Configuration diskette and follow the instructions supplied with your system.

Running the EISA Configuration Program

Different manufacturers offer various versions of the EISA Configuration program. Therefore, the titles and menu items listed in this section may not exactly match your system's EISA Configuration.

➡ **Note:** If you do not have a working copy of your EISA Configuration Diskette, make a working copy before configuring your system and use that copy for the configuration. For instructions on copying the diskette, see the manual that came with your system.

1. **Start the EISA Configuration Program.**

   - Shut down the system.
   - Insert the backup copy of the EISA Configuration Diskette and boot the system from this disk.
   - Follow the instructions on the screen to get to the Configuration menu.
   - Select "Manual Configuration," if offered. This provides information necessary for installing the driver software and ISA controllers.

2. **Copy the Computone Configuration files.**

   - Choose the "Copy files from a configuration diskette" option (or its equivalent) from the Configuration program main menu. The EISA Configuration program requests the product configuration diskette.
   - Insert the *Computone Option/Configuration Diskette* into the drive and press **ENTER**. Some systems require you to select the configuration files to copy. In this case, select the configuration file for the IntelliPort II product according to the following table.

File	Controller
!CTN0204.CFG	ISA 4-port
!CTN0208.CFG	ISA 8-port
!CTN0263.CFG	ISA 16-port or EXpandable, if configured for 8-bit I/O
!CTN0264.CFG	ISA 16-port or EXpandable, for normal 16-bit I/O operation
!CTN0218.CFG	EISA 8-port
!CTN0281.CFG	EISA 16-port or EXpandable

   - Remove the Computone Option/Configuration Diskette and store the diskette in a safe place.

3. **Add the controller.**

   - Replace the EISA Configuration Diskette in the drive.
   - If you are given a choice, select the "Advanced Configuration" option. This gives you information you will need later.
   - Select the "Add a Card" function. When you see the Configuration File Selection screen, select the IntelliPort II configuration file that matches the product you are installing.
   - The EISA Configuration program displays a list of free slots. Indicate the slot in which you want to install the controller. Write down the slot number in the IntelliPort II Hardware Configuration Log in Appendix A.

4. **Set the IRQ.**

   If you installed the drivers before installing the controller, you need to use the IRQ you selected during driver installation. You should have noted the IRQ in the IntelliPort II Hardware Configuration Log in Appendix A. If you are installing the controller first, check Table 2-1 and your operating system configuration to find an available IRQ.

   If you need to change the IRQ, use the arrow keys to move to the IRQ area and press **ENTER**. The EISA Configuration program displays a list of free IRQs for you to choose from. (You should make a note of the available IRQs in case you have conflicts during driver installation.)

   Write down the selected IRQ in the Hardware Configuration Log in Appendix A.

5. **Set the I/O address.**

   EISA controllers: The I/O address range is based on the slot number you chose previously. You cannot change this I/O address (and there is no need to change it since it cannot conflict with other hardware).

   ISA controllers: The EISA Configuration program displays a default I/O address. If you have already installed the driver software, and the I/O address you selected during that installation is different, you need to change the I/O address. You may also have to change the I/O address if you install more than one controller in the system. To change the I/O address, follow these steps:

- Use the arrow keys to move to the I/O Address area and press **ENTER**. The EISA Configuration program displays a list of I/O addresses for you to choose from.
- Use the "View Switch and Jumper Settings" command (or its equivalent) to see a diagram of how the I/C address switches should be set on the controller. Compare the diagram with the controller switches and make sure the switch settings agree with the display.
- Write down the selected I/O address in the Hardware Configuration Log in Appendix A.

For more information about I/O addresses, see Appendix B, "I/O Address Considerations."

6. **Save the configuration and reboot.**
   - Use the "Save" command to save the configuration information to a backup file and into system memory. This lets you quickly restore the configuration when you replace the system battery.
   - Exit the EISA Configuration program.
   - Remove the EISA Configuration Diskette and reboot your system.

Installing the Controller

To install the IntelliPort II controller in your system, follow these steps:

1. Power OFF the system.

> **Important**: DO NOT attempt to install the controller while the system is powered ON. If you do, you can damage both the controller and the system.

2. Remove the cover from your system. If you are not sure which screws secure the cover, follow the instructions in the manual that came with your computer.

3. Install the controller in any available 16-bit or EISA slot. Make sure the controller does not touch components, such as SIMMs or other high-profile parts, on the motherboard or other adjacent hardware.

4. Replace the system cover.

After installing the controller, proceed to the section "Connecting Interface Modules" for standard IntelliPort II controllers or "Connecting Expansion Modules" for IntelliPort II EXpandable controllers.

Installing in a Micro Channel System

The procedure for installing an IntelliPort II controller in an Micro Channel system consists of two major steps:

1. Install the IntelliPort II controller in your system and connect any external modules as needed.

2. Run the Micro Channel Configuration program supplied with your computer and configure the system to recognize the IntelliPort II.

> **Important**: You must install the controller before running the Micro Channel Configuration program.

Installing the Controller

To install the IntelliPort II controller in your system, follow these steps:

1. Power OFF the system.

> **Important**: DO NOT attempt to install the controller while the system is powered ON. If you do, you can damage both the controller and the system.

2. Remove the cover from your system. If you are not sure which screws secure the cover, follow the instructions in the manual that came with your computer.

3. Install the controller in any available slot. Make sure the controller does not touch components, such as SIMMs or other high-profile parts, on the motherboard or other adjacent hardware.

4. Replace the system cover.

After installing the controller, proceed to the section "Connecting Interface Modules" for standard IntelliPort II controllers, or "Connecting Expansion Modules" for IntelliPort II EXpandable controllers, later in this chapter. When you have connected the external modules, proceed to the next section, "Running the Micro Channel Configuration Program."

Running the Micro Channel Configuration Program

Different manufacturers offer various versions of the Micro Channel Configuration program. Therefore, the titles and menu items listed in this section may not exactly match your system's Micro Channel Configuration.

➡ **Note**: If you do not have a working copy of your *Micro Channel Reference Diskette*, make a working copy before configuring your system and use that copy for the configuration. For instructions on copying the diskette, see the manual that came with your system.

The following steps assume you have installed the IntelliPort II controller in your system.

1. **Run the Micro Channel Configuration program.**
   - Shut down the system.
   - Insert your working copy of the *Micro Channel Reference Diskette* and boot the system from this disk.
   - Follow the instructions on the screen to get to the main menu of the Micro Channel Configuration program.

2. **Copy the Computone Configuration files.**
   - Choose the "Copy an Option diskette" option (or its equivalent) from the main menu. The Configuration program requests the Option diskette.
   - Insert the *Computone Option/Configuration Diskette* into the drive and press **ENTER**. The system copies the IntelliPort II configuration files onto the Reference diskette.
   - Remove the *Computone Option/Configuration Diskette* and store the diskette in a safe place.

3. **Indicate the slot location of the controller.**

   - At the Configuration program main menu, select the "Set Configuration" option (or its equivalent).
   - Select the "Change Configuration" option (or its equivalent) from the Configuration menu. The Configuration program lists the controllers installed in the system.
   - Select the entry for the IntelliPort II controller.

4. **Set the IRQ and I/O address.**

   You can usually accept the default IRQ and I/O address provided by the Micro Channel Configuration program. There are times when you may need to override these values—for example, to assign multiple IntelliPort II controllers to the same IRQ.

   Follow these steps:

   - If you need to change the IRQ, use the arrow keys to move to the IRQ area. Use the function keys provided (for example, some systems use the **F5** and **F6** keys) to step through the available IRQs.

     You should make a note of the available IRQs in case you have conflicts during driver installation.

   - If you need to change the I/O address, use the arrow keys to move to the "I/O Address" area. Use the function keys provided to step through the available I/O addresses.

     You should make a note of the available I/O addresses in case you have conflicts during driver installation.

   - Write down the selected IRQ and I/O address in the Hardware Configuration Log in Appendix A.

5. **Save the configuration and reboot.**

   - Use the "Save" command to save the configuration information. The new configuration is now stored in system memory and on your working copy of the *Micro Channel Reference Diskette.*
   - Return to the main menu and exit the Micro Channel Configuration program.
   - Remove the *Micro Channel Reference Diskette* and reboot your system.

Connecting Expansion Modules (IntelliPort II EXpandable only)

If you are installing a standard IntelliPort II, read the section "Connecting Interface Modules" later in this chapter.

The following steps assume that you have already installed the IntelliPort II EX controller in your system and performed any necessary system configuration. You must connect the expansion modules while the system is powered OFF.

1. **Find a location for the expansion modules.**

   - You can place the IntelliPort II EX expansion modules in any convenient location. The RS-232 specification recommends that you limit serial cables to 50 feet (15 m) or less.
   - If you have expansion modules with the Cable Management System™ enclosure, make sure there is adequate clearance for you to open the doors (you can remove the doors if necessary). The Cable Management System lets you route cables out the top or bottom.

2. **Power down your system.**

   You *must* power down before connecting or disconnecting IntelliPort II expansion modules. Changing connections on a live system can damage both the controller and attached expansion modules.

3. **Attach the expansion modules to each other, if necessary.**

   - If you have more than one expansion module, connect them together and secure the expansion modules to each other with the supplied clips (see Figure 2-2).

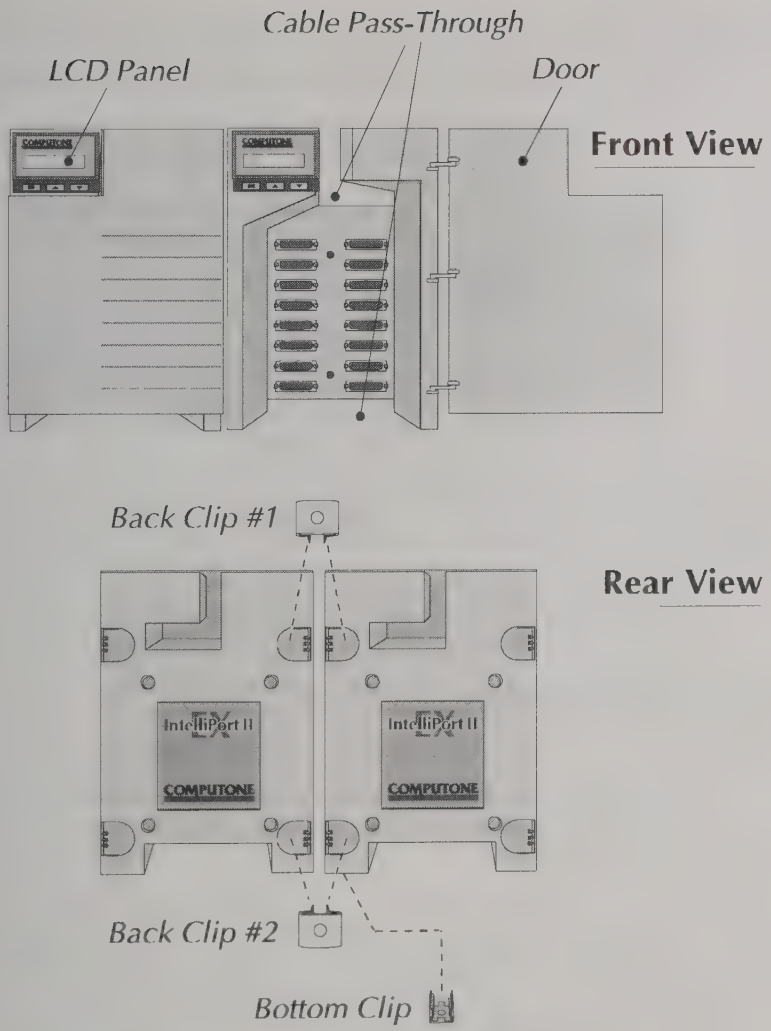


Figure 2-2. Expansion module attachment scheme

4. Attach a Power Adapter Module (PAM), if necessary.

Under normal conditions, you need a PAM if you have more than 32 serial devices connected and active. Conditions that affect power consumption include the number of terminals connected, the number of slots in use, and the host's power supply capacity.

See Chapter 5, "Troubleshooting," for information about power-related problems. If you need a PAM, follow these steps:

- Attach the Power Adapter Module between the first expansion module and the bus cable, as shown in Figure 2-3.
- Connect the power cord from the PAM power supply to the power connector on the PAM.

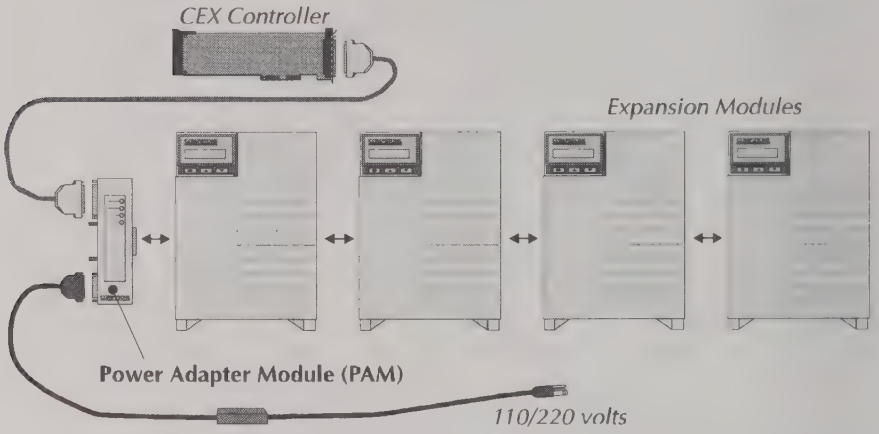


Figure 2-3. PAM attachment scheme

5. Connect the IntelliPort II EX to the expansion modules.

- Attach the IntelliPort II EX bus cable between the controller and the first expansion module (or the data connector on the PAM, if installed).

> **Important**: Use only the supplied bus cable to connect the controller to the expansion modules. If you try using a longer cable in place of the bus cable, operation may become unreliable.

- For information on data cables, see Chapter 3, "Cabling."

Connecting Interface Modules (standard IntelliPort II only)

If you are installing an IntelliPort II EXpandable, read the section "Connecting Expansion Modules" earlier in this manual.

The following steps assume that you have already installed the IntelliPort II controller in your system and have configured the system.

1. **Find a location for the interface module.**

   You can place the IntelliPort II interface module in any convenient location. The RS-232 specification recommends that you limit serial cables to 50 feet (15 m) or less.

2. **Power down your system.**

   You *must* power down before connecting or disconnecting IntelliPort II 16-port interface modules. Changing connections on a live system can damage the controller.

3. **Connect the IntelliPort II to the interface module.**

   - Attach the cable between the interface module and the IntelliPort II controller. See Figure 2-4. If you have a 16-port IntelliPort II, make sure you connect the interface module before booting the system or the drivers will report an error.
   - For information on data cables, see Chapter 3, "Cabling."

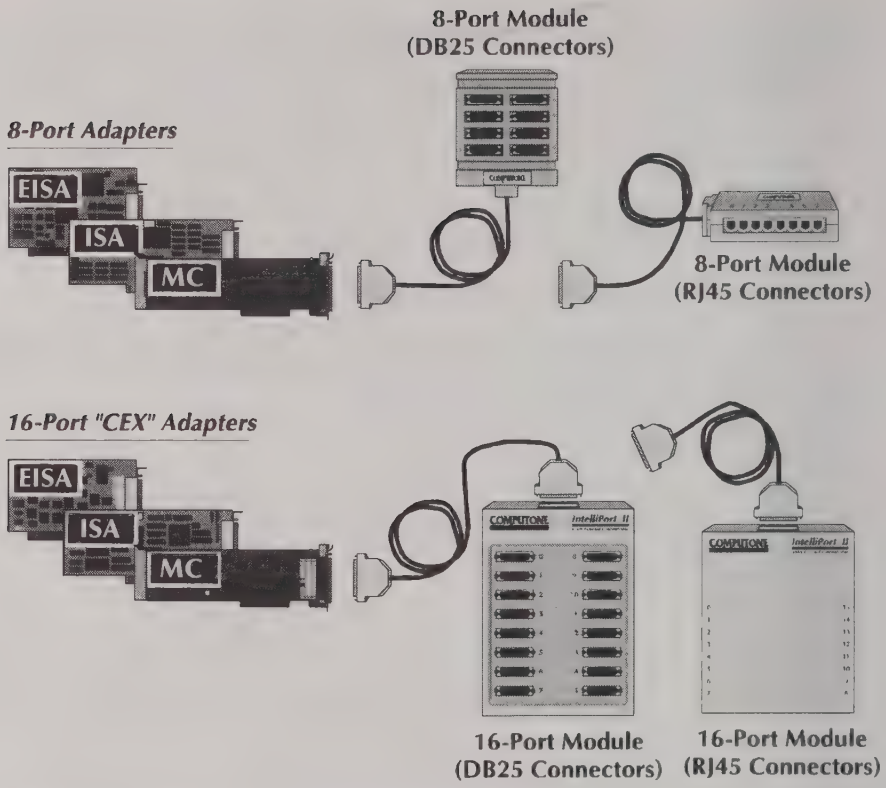


Figure 2-4. Interface module attachment scheme

Chapter 3
Cabling

This chapter describes cable wiring for most applications.

This chapter covers the following topics:

- Computone cable accessories
- IntelliPort II port pinouts
- Connecting terminals and PCs
- Connecting PCs with DB-9 serial ports
- Connecting modems
- Connecting printers

Computone Cable Accessories

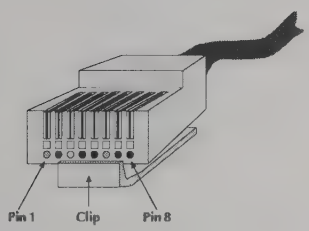
Computone supplies RJ-45 to DB-25 adapter cables that work for most applications. The cable assemblies are "pigtail" cables, about a foot long. Use a standard straight-through cable to connect the pigtail to the device.

IntelliPort II-compatible cable accessories available from Computone are:

P/N	Description
2-20086	8-wire cable, 1 ft. long, RJ-45 to DB-25 (female). Connects an IntelliPort II RJ-45 port to most terminals.
1-05700	8-wire cable, 1 ft. long, RJ-45 to DB-25 (male). Connects an IntelliPort II RJ-45 port to most modems.
1-05701	DB-25 (male) to RJ-45 (female) adapter box. Connects most terminals to IntelliPort RJ-45 ports.

IntelliPort II Port Pinouts

On IntelliPort II products, RJ-45 connectors have eight pins with the following pinouts:



Pin	Type	Signal
1	Input	Clear to Send (CTS)
2	Output	Data Terminal Ready (DTR)
3	Output	Transmit Data (TxD)
4		Signal Ground (SG)
5	Input	Carrier Detect (DCD) and Data Set Ready (DSR)
6	Input	Receive Data (RxD)
7	Output	Request to Send (RTS)
8		Chassis Ground (CG)

➡ **Note**: Cables with RJ-45 connectors should conform to RS-232 specifications for length and shielding. In particular, you should limit flat telephone-style wiring to very short runs.

IntelliPort II ports using DB-25 connectors use DTE signal names, but are wired with the equivalent of a null modem cable. This lets you connect terminals and other DTE devices with a straight-through cable. The RS-232 connectors have the following pinouts:

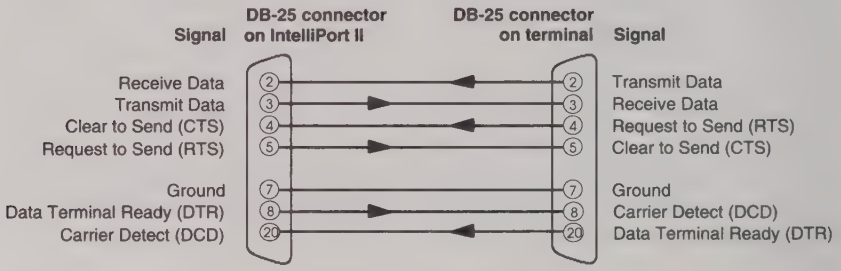
Pin	Type	Signal	Abbr.	Notes
1		Chassis Ground	CG	
2	Input	Receive Data	RxD	
3	Output	Transmit Data	TxD	
4	Input	Clear to Send	CTS	
5	Output	Request to Send	RTS	
6*	Output	Data Terminal Ready	DTR	
7		Signal Ground	SG	
8*	Output	Data Terminal Ready	DTR	
11	Input	Data Set Ready	DSR	II EXpandable only
20	Input	Carrier Detect	DCD	
22	Input	Ring Indicator	RI	II EXpandable only

* Pins 6 and 8 are tied together internally.

Connecting Terminals and PCs with DB-25 Connectors

If your IntelliPort II product has DB-25 connectors, you can use a straight-through cable to connect terminals and PCs with DB-25 serial ports. If your IntelliPort II product has RJ-45 connectors, you can use the standard Computone adapter cable (part number 2-20086).

The standard straight-through cable is wired as follows (arrows show the direction of each signal):

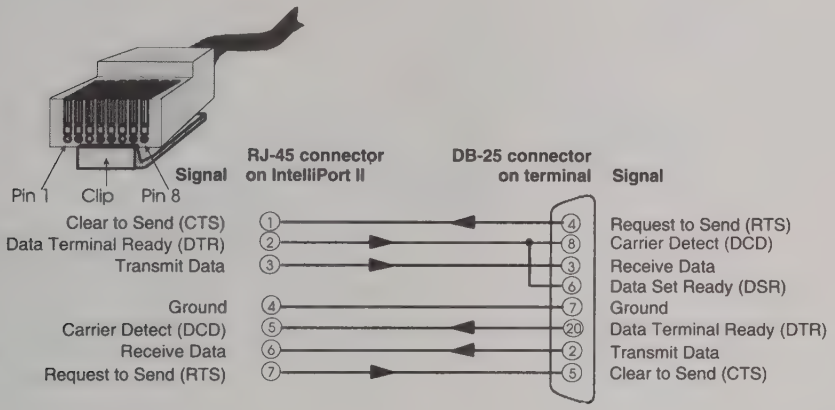


If you need the DSR signal on the IntelliPort II end, tie pin 11 to pin 20.

Most host systems use the DTR signal to automatically disconnect a port when the connected terminal or PC is powered down (which deasserts DTR). If you do not need this feature, or your operating system does not support it, you can connect pins 6, 8, and 20 together on both sides of the cable and run only five wires (pins 2 through 5 and pin 7).

If you use only software flow control (XON/XOFF), you can tie pins 4 and 5 together at the IntelliPort II connector and leave pins 4 and 5 disconnected at the terminal or PC. When combined with the DTR bypass scheme mentioned previously, this results in a three-wire cable (pins 2, 3, and 7).

If you have RJ-45 connectors on your IntelliPort II, use the following cable (equivalent to Computone part number 2-20086):



Note that pins 6 and 8 are tied together at the terminal or PC. If you do not need DSR at the terminal or PC, you can omit pin 6 at the DB-25 connector and connect pin 2 of the RJ-45 connector to pin 8 of the DB-25 connector.

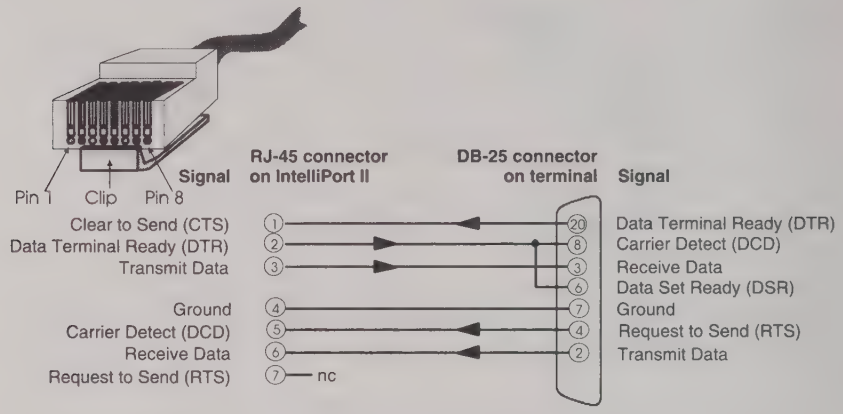
Most host systems use the DTR signal to automatically disconnect a port when the connected terminal or PC is powered down (which deasserts DTR and RTS). If you do not need this feature, or your operating system does not support it, you can connect pins 6, 8, and 20 together at the terminal or PC (the DB-25 connector) and pins 2 and 5 together at the IntelliPort II (the RJ-45 connector*) and run only five wires.

If you use only software flow control (XON/XOFF), you can tie pins 1 and 7 together at the IntelliPort II connector and leave pins 4 and 5 disconnected at the terminal or PC. When combined with the DTR bypass scheme mentioned previously, this results in a three-wire cable (pins 2, 3, and 7).

---

* The simplest way to do this is to connect these pins and tie the leads together inside the DB-25 connector shell.

If you have a terminal or other device that uses DTR for flow control, and your host system always expects the terminal to use RTS for flow control, use the following cable:

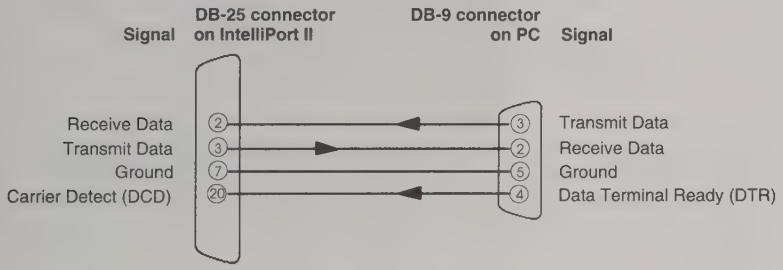


Note that pins 6 and 8 are tied together at the terminal. If you do not need DSR at the terminal, you can omit pin 6 at the DB-25 connector and connect pin 2 of the RJ-45 connector to pin 8 of the DB-25 connector.

Connecting PCs with DB-9 Serial Ports

This section deals with direct cables for PCs with DB-9 serial port connectors. If you would rather use a standard set of cables, you can purchase DB-9 to DB-25 adapters from most computer stores and mail order outlets.

If your IntelliPort II product has DB-25 connectors, the cable is wired as follows (arrows show the direction of each signal):



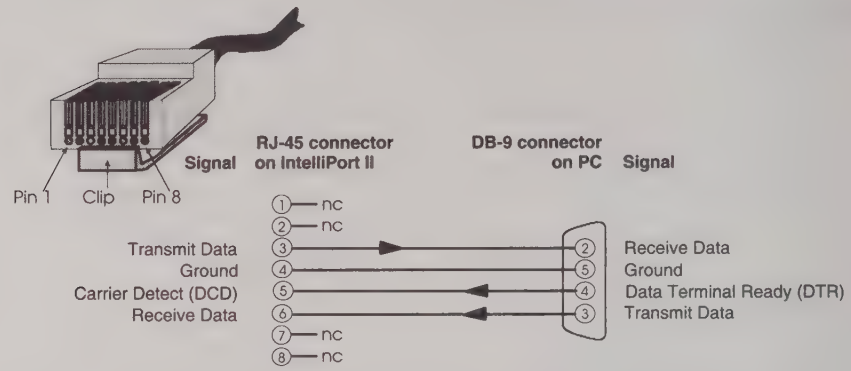
The above cable works with most terminal emulation applications using software flow control and DTR modem control. If you need hardware flow control and full modem control, add the following connections:

IntelliPort II DB-25 Pin #	DB-9 Pin #
4	7
5	8
8	1

If the host requires the DSR signal, tie pin 11 to pin 20 (only for the IntelliPort II EXpandable).

Most PCs use the DTR signal to automatically disconnect from the host port when the connected PC hangs up (which deasserts DTR). If you do not need this feature, or your operating system does not support it, you can connect pins 6, 8, and 20 together at the IntelliPort II DB-25 connector, and connect pins 1, 4, and 6 together at the PC.

If you have RJ-45 connectors on your IntelliPort II, use the following cable:



The above cable works with most terminal emulation applications using software flow control and DTR modem control. If you need hardware flow control and full modem control, add the following connections:

IntelliPort II RJ-45 Pin #	DB-9 Pin #
1	7
7	8
2	1

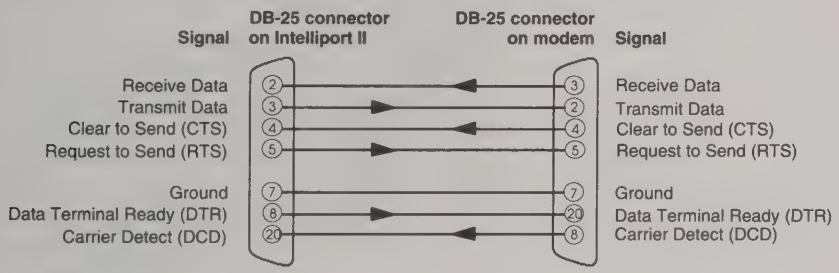
Most PCs use the DTR signal to automatically disconnect from the port when the connected PC hangs up (which deasserts DTR). If you do not need this feature, or your operating system does not support it, you can omit the DTR connection and tie pins 2 and 5 together at the IntelliPort II (the RJ-45 connector*) and run only three wires.

* The simplest way to do this is to connect these pins on the RJ-45 connector, run the leads through the cable, and tie the leads together inside the DB-25 connector shell.

Connecting Modems

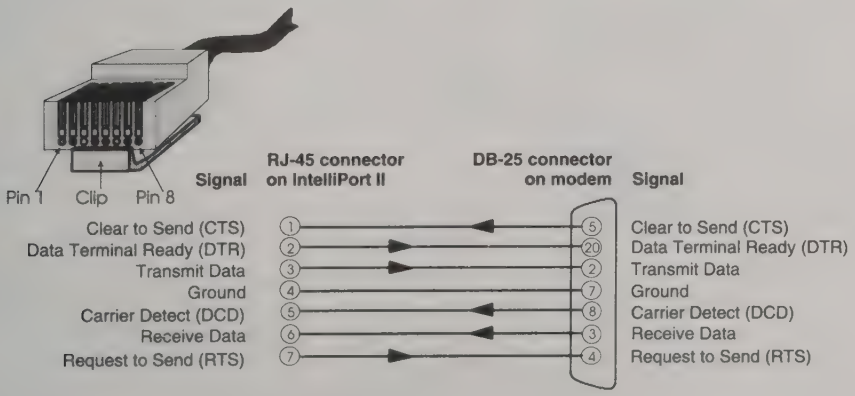
If your IntelliPort II product has DB-25 connectors, you can connect modems with a standard null modem cable or connector. If your IntelliPort II product has RJ-45 connectors, you can use a straight-through cable with a modem pigtail (Computone part number 1-05700).

The standard modem adapter cable is wired as follows (arrows show the direction of each signal):



If you need the DSR signal, connect pin 11 of the IntelliPort II connector to pin 6 of the modem connector.

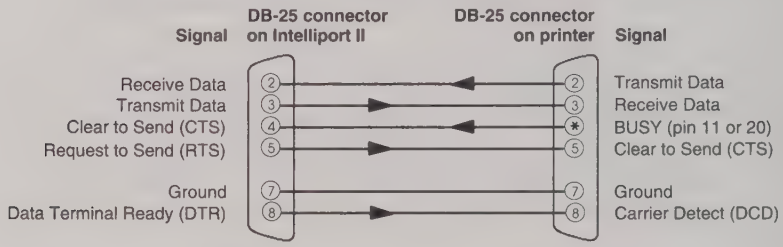
If you have RJ-45 connectors on your IntelliPort II, use the following cable:



Connecting Printers

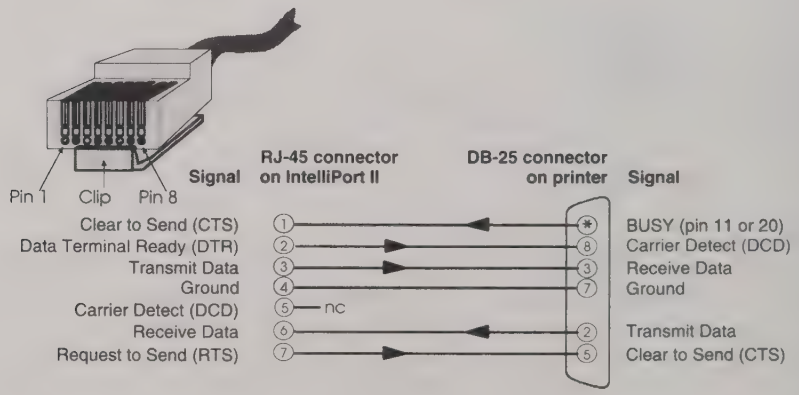
Printer cables differ from terminal or modem cables. For example, many printers with serial interfaces provide flow control on either pin 11 or pin 20. When connecting printers to an IntelliPort II, try using cables with the pinouts shown below. If these cables do not work, Computone Technical Support may be able to suggest a solution.

If your IntelliPort II product has DB-25 connectors, the cable is wired as follows (arrows show the direction of each signal):

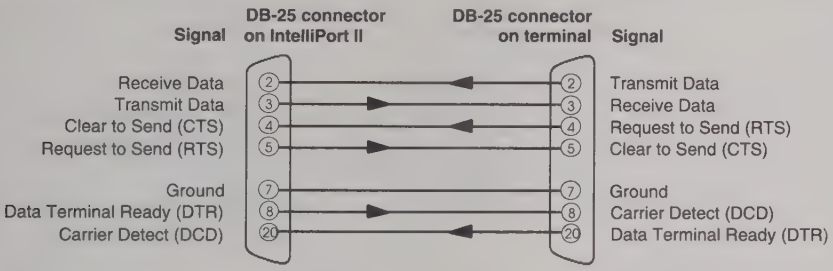


See your printer manual to determine whether pin 11 or 20 is the BUSY line. (This signal may also be called DTR, Reverse Channel, Supervisory Send Data (SSD), Secondary RTS, or other names.)

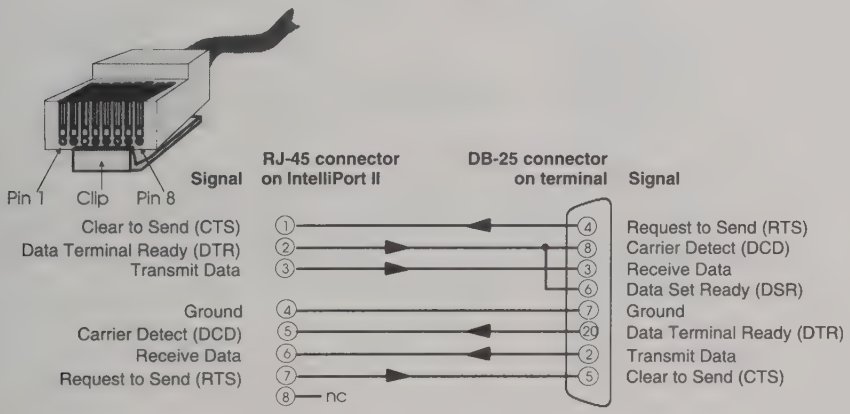
If you have RJ-45 connectors on your IntelliPort II, the printer cable is wired as follows:



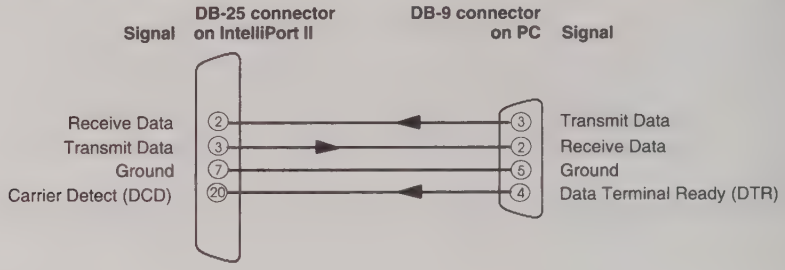
Cable Summary: Terminals

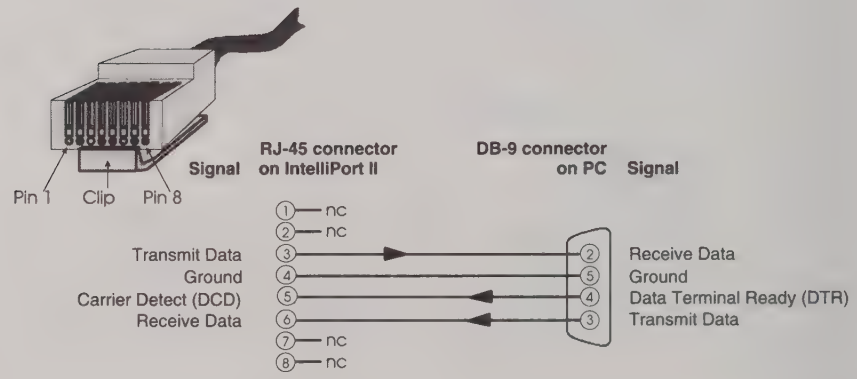


➡ **Note**: Depending on flow control requirements, you may be able to eliminate connections to CTS, RTS, DTR, or DCD.

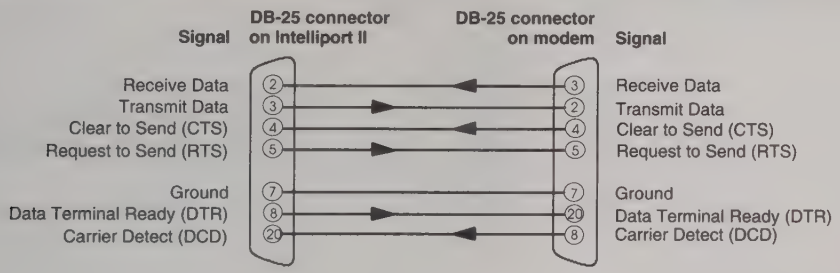


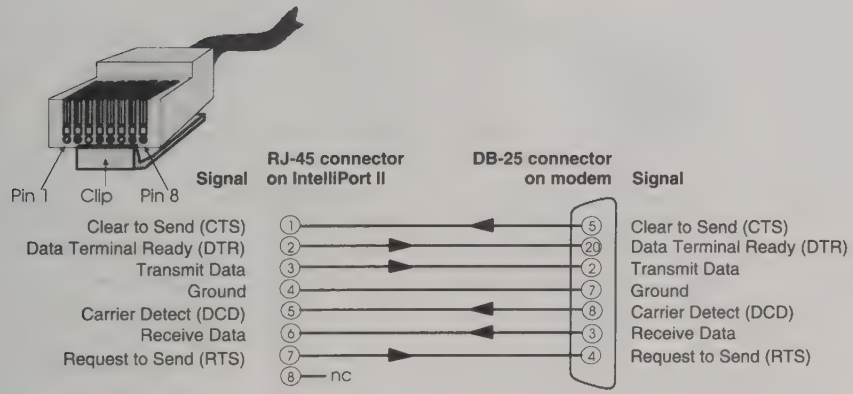
Cable Summary: PC (DB-9)



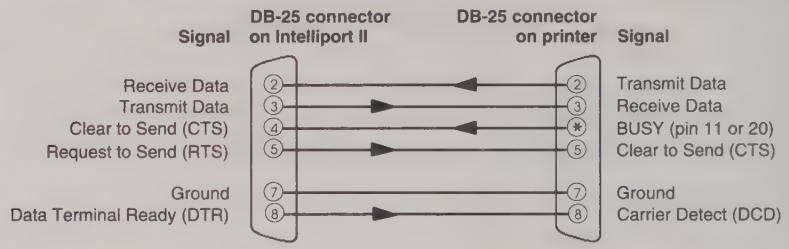


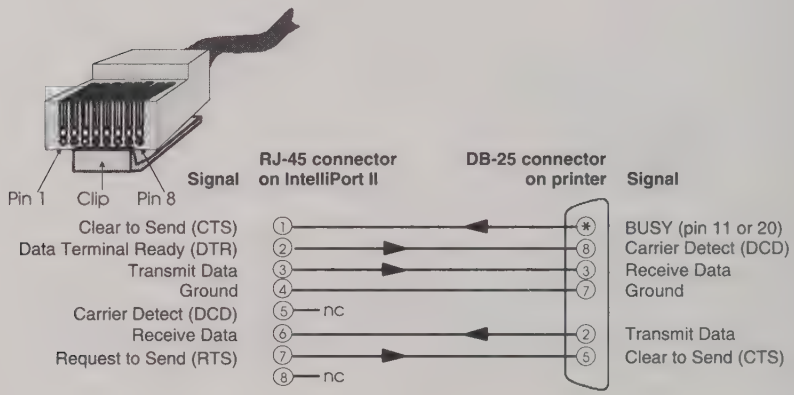
Cable Summary: Modems





Cable Summary: Printers





Chapter 4
IntelliPort II Expansion Modules

This chapter describes the available expansion modules for the IntelliPort II EXpandable, and covers the following topics:

- Expansion module models
- LCD control panel
- LCD menus

If you have a standard (non-expandable) IntelliPort II product, skip this chapter.

Expansion Module Models

Computone expansion modules are available as shown in Table 4-1. "CMS" refers to Computone's Cable Management System enclosure.

Table 4-1. Expansion Modules

# of ports	Connector Type	
	DB-25	RJ-45
8	EX-8D	EX-8R
16	EX-16D	EX-16R
16 with CMS	EX-16DC	EX-16RC

All expansion modules include an LCD Control Panel to monitor port functions and to run diagnostics on ports, and are compatible with all three IntelliPort II EXpandable controllers. The Cable Management System enclosure has a detachable door that conceals and protects cables and connectors.

LCD Control Panel

Expansion modules have an LCD Control Panel with three buttons (see Figure 4-1). You can use this panel to monitor various diagnostic and informational routines performed by the expansion module firmware.

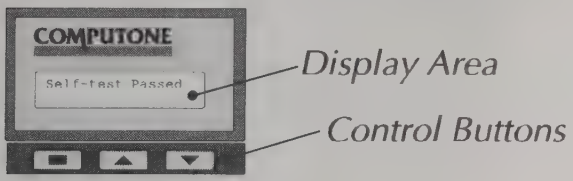


Figure 4-1. LCD Control Panel

You control the expansion module monitor with three buttons. Table 4-2 shows the effects of each button press and of combinations of button presses.

Table 4-2. Expansion Module Buttons and Combinations

Buttons	Effect
[▲]	Displays the previous menu choice.
[▼]	Displays the next menu choice.
[●]	Selects the menu choice currently displayed. If you are at one of the choices in the Main Menu, this moves you to a submenu. Press and hold this button for several seconds to return to the Main Menu from any submenu.
[●] [▲]	Increases the intensity of the LCD display.
[●] [▼]	Decreases the intensity of the LCD display.

(*continued on next page*)

Table 4-2. Expansion Module Buttons and Combinations (*continued*)

[●] [▲] [▼]	Makes the currently-selected monitoring function (Monitor a Port, Monitor a Signal, or Estimate CPS) the power-up default. The intensity of the display changes to verify that you are storing this menu. When you release the buttons, the display returns to its previous intensity. To have the expansion module display the Main Menu at startup, move to the Main Menu (or the Diagnostics menu) and press all three buttons. You cannot make the Diagnostics menu the default menu.

Menus

When you power-on or reboot the computer to which the expansion modules are connected, the controller runs a self-test. One of the following messages appear on the LCD display:

```
Self-test Passed
```

-OR-

```
** Main  Menu **
 Monitor a Port
```

You may also see one of the monitoring functions, if you have set one as the power-up default.

If you see the "Self-test Passed" message, press [●] to see the Main Menu. The following items are available in the Main Menu:

- Monitor a Port — Monitors all data signals on a selected port.
- Monitor a Signal — Monitors a selected data signal on all ports.
- Estimate CPS — Estimate the throughput being transmitted and received by a selected port.
- Diagnostics — Runs loopback and transmit tests on a selected port.

To access any menu item, press the [▲] or [▼] keys to scroll through the choices. When you see the choice you want, press [●]. The sections following describe each menu item and the choices within that item.

Monitor a Port

The Monitor a Port menu lets you monitor the following data signals on a selected port:

Signal name	Symbol: Asserted	Deasserted
Transmit Data	TD	td
Data Terminal Ready	DTR	dtr
Request to Send	RTS	rts
Receive Data	RD	rd
Carrier Detect	CD	cd
Clear to Send	CTS	cts
Data Set Ready	DSR	dsr
Ring Indicator	RI	ri

To select the Monitor a Port menu, go to the Main Menu and press the ▲ or ▼ buttons until you see the following display:

```
** Main  Menu **
 Monitor a Port
```

Press the ● button to enter the Monitor a Port menu.

```
0: td DTR RTS
rd cd cts dsr ri
```

Use the ▲ and ▼ buttons to change the port to be monitored.

The top row of signals (TD, DTR, and RTS) are outputs from the port. The bottom row of signals (RD, CD, CTS, DSR, and RI) are inputs. The data signals shown in lowercase are inactive, and the data signals shown in UPPERCASE are active. For example, in the illustration above, the Data Terminal Ready and Request to Send signals are active on port 0.

To return to the Main Menu, press the ● button.

Monitor a Signal

The Monitor a Signal menu lets you monitor one of the following data signals on all ports:

- Transmit Data (TD)
- Data Terminal Ready (DTR)
- Request to Send (RTS)
- Receive Data (RD)
- Carrier Detect (CD)
- Clear to Send (CTS)
- Data Set Ready (DSR)
- Ring Indicator (RI)

To select the Monitor a Signal menu, go to the Main Menu and press the [▲] or [▼] buttons until you see the following display:

```
** Main  Menu **
Monitor a Signal
```

Press the [●] button to enter the Monitor a Signal menu.

```
RXD - pin 2
    MMMMMMMM
```

Use the [▲] and [▼] buttons to change the data signal to be monitored. The screen displays the pin number of the signal that you have selected and the status code of the signal on each port on the expansion module (the display above is typical of an eight-port model).

The following status codes are valid:

Code	TxD, RxD	Other Signals
↑	Data is being sent across this port	Signal is asserted (positive voltage)
↓	Data is being sent across this port	Signal is deasserted (negative voltage)
M	No activity (marking at negative voltage)	(only on data signals)
S	BREAK signal (spacing at positive voltage)	(only on data signals)

To return to the Main Menu, press the [●] button.

Estimate CPS

The Estimate CPS menu displays the throughput, in characters per second (CPS), being transmitted and received by a given port.

To select the Estimate CPS menu, go to the Main Menu and press the [▲] or [▼] buttons until you see the following display:

```
** Main  Menu **
  Estimate CPS
```

Press the [●] button to enter the Estimate CPS menu.

```
0: tx cps 0
0: rc cps 0
```

The first line of the display shows the transmit throughput. The second line shows the receive throughput. Throughput is measured in characters per second. The expansion module updates the display each second. Use the [▲] or [▼] buttons to see the throughput for a different port.

To return to the Main Menu, press the [●] button.

Diagnostics

The Diagnostics menu lets you run the following tests on a single, inactive port:

Local Loopback — Transmits a data pattern out the selected port and compares that data with incoming data to make sure they match. This test requires an external loopback adapter (described on the following page).

Remote Loopback — Echoes data received from the selected port. This test requires a terminal or other data generation device.

Internal Loopback — Transmits a data pattern on the selected port but loops the data back within the port's UART.

Transmit Pattern — Transmits a data pattern out the selected port. This test requires an external serial device, such as a terminal or printer.

To select the Diagnostics menu, go to the Main Menu and press the [▲] or [▼] buttons until you see the following display:

```
** Main  Menu **
  Diagnostics
```

Press the [●] button to enter the Diagnostics menu.

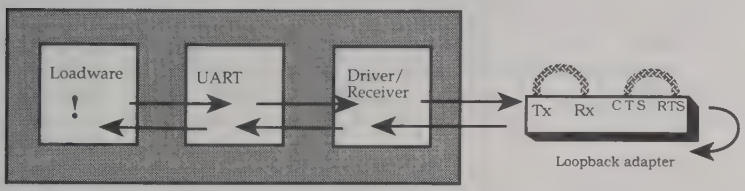
```
  Diagnostics
Local Loopback
```

Use the [▲] or [▼] buttons to move to the test you want to perform, then press the [●] button.

Local Loopback

The local loopback test transmits a data pattern out of a specific port and then compares received data with the transmitted data to make sure they match. To do this, you need to buy or build a loopback adapter that connects pin 2 to pin 3 (TxD and RxD), and pin 4 to pin 5 (RTS to CTS). On a port with an RJ-45 connector, use a DB-25 adapter cable and attach the loopback adapter to the other end of the cable.

You can use Local Loopback to test both the port hardware and the cable. If you connect the loopback adapter to the cable, make sure the cable is less than 25 feet (or 7.5 meters) long.



When you enter the Local Loopback submenu, the LCD shows the following:

```
Remote Loopback
   Baud Rate
```

This is a menu that lets you set up the port parameters. Press the [▲] or [▼] buttons to move through the selections, and press the [●] button to change values for the currently-displayed selection. The selections are:

- Baud Rate - determines the data rate, in bits per second, at which the port sends the loopback test pattern. Choose one of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 56000, 57600, 64000, 76800, or 115200.

- Data Bits - determines how many data bits make up each character. Choose one of 7 or 8.

- Stop Bits - determines how many stop bits the port sends with each character. Choose one of 1, 1.5, or 2.

- Parity - determines what parity, if any, the port sends for each character. Choose one of no parity, odd parity, even parity, space parity, or mark parity.

- Data Pattern - determines what data the port sends during the loopback test. Choose one of the following:
  - Columns - sends a pattern of 78 printable characters, followed by CR and LF. All lines are identical.
  - Barber Pole - similar to the Columns pattern, but the characters rotate through the ASCII character set. The first line begins with 'a', the next line with 'b', and so on.
  - UUUUU... - sends a continuous stream of the uppercase ASCII letter U. This is useful for troubleshooting using an oscilloscope.

- Tx Flow Control - determines what type of flow control the port recognizes for data transmitted during the loopback test. Choose one of None, Xon/Xoff, or CTS (CTS flow control requires you to loop pin 4 to pin 5). Generally, flow control has no effect on this test since the test sends one character then compares it to what it received before sending the next character.

- Port Number - determines which port performs the loopback test. The port must be idle. Choose one of ports 0 through 7 for the eight-port expansion module, or ports 0 through 15 for the 16-port expansion module.

- Begin - starts the Local Loopback test. Connect the loopback adapter and press the ⊡ button to start.

- Previous Menu - returns you to the Diagnostics menu.

When you select Begin, the LCD displays the following message:

```
Install Loopback
Press ⊡ to start
```

Make sure the loopback adapter is connected, then press the [•] button. The LCD should display:

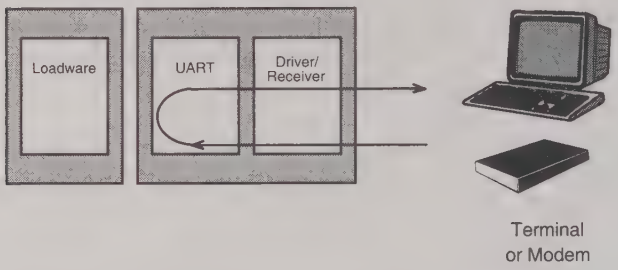
```
Local Loopback
Running...
```

The diagnostic sends the specified data pattern to the port, one character at a time, then compares the incoming character with the character just sent. Press the [•] button to stop the loopback test.

If an error occurs during the loopback test, the test stops immediately and the LCD displays an error message. See "Error Messages" later in this chapter for details.

Remote Loopback

The Remote Loopback test echoes received characters. This test is useful for testing cabling and wiring. The following illustration shows the signal path in the Remote Loopback test.



When you enter the Remote Loopback submenu, the LCD shows the following:

```
Remote Loopback
  Baud Rate
```

This is a menu that lets you set up the port parameters. Press the ▲ or ▼ buttons to move through the selections, and press the ● button to change values for the currently-displayed selection. The selections are:

- Baud Rate - determines the data rate, in bits per second, of the port. This rate must match the terminal's configuration. Choose one of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 56000, 57600, 64000, 76800, or 115200.

- Data Bits - determines how many data bits make up each character. Choose one of 7 or 8. The number of data bits must match the terminal's configuration.

- Stop Bits - determines how many stop bits the port sends with each character. Choose one of 1, 1.5, or 2. The number of stop bits must match the terminal's configuration.

- Parity - determines what parity, if any, the port sends for each character. Choose one of no parity, odd parity, even parity, space parity, or mark parity. The parity must match the terminal's configuration.

- Data Pattern - this selection has no effect on the Remote Loopback test.
- Tx Flow Control - determines what type of flow control the port recognizes for data transmitted during the loopback test. Choose one of None, Xon/Xoff, or CTS.
- Port Number - determines which port performs the loopback test. The port must be idle. Choose one of ports 0 through 7 for the eight-port expansion module, or ports 0 through 15 for the 16-port expansion module.
- Begin - starts the Remote Loopback test. Connect a device to the port and press the [•] button to start.
- Previous Menu - returns you to the Diagnostics menu.

When you select Begin, the LCD displays the following message:

```
Cable to Remote
Press ⊡ to start
```

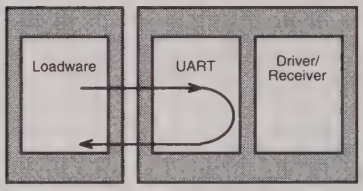
Make sure the terminal is connected, then press the [•] button. The LCD should display:

```
Remote Loopback
Running...
```

If you connected a terminal to the port, the port should accurately echo all characters typed at the terminal's keyboard. Press the [•] button to stop the loopback test.

Internal Loopback

The internal loopback test sends a signal between the loadware and the UART. The figure below shows the path of signals in the internal pattern test.



You can use the Internal Loopback test in conjunction with other loopback tests to find the cause of port-related problems. For example, if the Internal Loopback test passes and the Local Loopback test fails, the problem is in either the cable or the RS-232 driver/receiver circuitry.

When you enter the Internal Loopback submenu, the LCD shows the following:

```
Intrnl Loopback
   Baud Rate
```

This is a menu that lets you set up the port parameters. Press the [▲] or [▼] buttons to move through the selections, and press the [●] button to change values for the currently-displayed selection. The selections are:

- Baud Rate - determines the data rate, in bits per second, at which the port sends the loopback test pattern. Choose one of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 56000, 57600, 64000, 76800, or 115200.

- Data Bits - determines how many data bits make up each character. Choose one of 7 or 8.

- Stop Bits - determines how many stop bits the port sends with each character. Choose one of 1, 1.5, or 2.

- Parity - determines what parity, if any, the port sends for each character. Choose one of no parity, odd parity, even parity, space parity (parity bit always 0), or mark parity (parity bit always 1).

- Data Pattern - this selection has no effect for the Internal Loopback test.
- Tx Flow Control - this selection has no effect for the Internal Loopback test.
- Port Number - determines which port performs the loopback test. The port must be idle. Choose one of ports 0 through 7 for the eight-port expansion module, or ports 0 through 15 for the 16-port expansion module.
- Begin - starts the Internal Loopback test.
- Previous Menu - returns you to the Diagnostics menu.

When you select Begin, the LCD displays the following message:

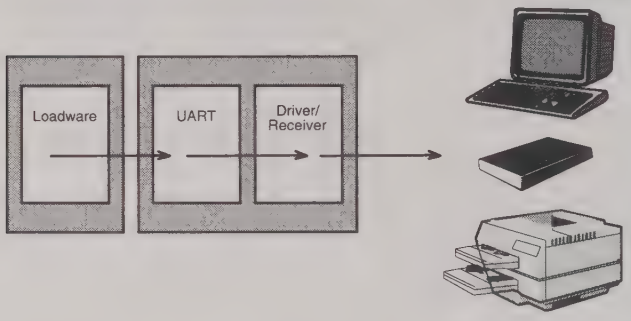
```
Intrnl Loopback
Running...
```

Press the ● button to stop the loopback test.

If an error occurs during the loopback test, the test stops immediately and the LCD displays an error message. See "Error Messages" later in this chapter for details.

Transmit Pattern

The transmit pattern test transmits a test pattern to an attached console, terminal, or printer. This test is useful to verify that a cable connected to a particular port is wired correctly, or to test a printer connection. The figure below shows the signal path of the transmit pattern test.



Terminal, Modem,
or Printer

When you enter the Transmit Pattern submenu, the LCD shows the following:

```
Transmit Pattern
   Baud Rate
```

This is a menu that lets you set up the port parameters. Press the [▲] or [▼] buttons to move through the selections, and press the [●] button to change values for the currently-displayed selection. The selections are:

- Baud Rate - determines the data rate, in bits per second, of the port. This rate must match the device's configuration. Choose one of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 56000, 57600, 64000, 76800, or 115200.

- Data Bits - determines how many data bits make up each character. Choose one of 7 or 8. The number of data bits must match the device's configuration.

- Stop Bits - determines how many stop bits the port sends with each character. Choose one of 1, 1.5, or 2. The number of stop bits must match the device's configuration.

- Parity - determines what parity, if any, the port sends for each character. Choose one of no parity, odd parity, even parity, space parity, or mark parity. The parity must match the device's configuration.

- Data Pattern - determines what data the port sends as a transmit pattern. Choose one of the following:
  - Columns - sends a pattern of 78 printable characters, followed by CR and LF. All lines are identical.
  - Barber Pole - similar to the Columns pattern, but the characters rotate through the ASCII character set. The first line begins with 'a', the next line with 'b', and so on.
  - UUUUU... - sends a continuous stream of the uppercase ASCII letter U. This is useful for troubleshooting using an oscilloscope.

- Tx Flow Control - determines what type of flow control the port recognizes to stop transmitting data transmitted during the test. Choose one of None, Xon/Xoff, or CTS.

- Port Number - determines which port sends the transmit pattern. The port must be idle. Choose one of ports 0 through 7 for the eight-port expansion module, or ports 0 through 15 for the 16-port expansion module.

- Begin - starts the Transmit Pattern test. Connect the RS-232 device and press the [•] button to start.

- Previous Menu - returns you to the Diagnostics menu.

When you select Begin, the LCD displays the following message:

```
Transmit Pattern
  Running...
```

Check the output to verify that it matches the data pattern you specified. Press the [•] button to stop the transmit pattern test.

Error Messages

If a problem occurs during any diagnostic test, the test stops immediately and the LCD displays one of the following messages:

The port is not idle. Either an application is using the port, or the port has data in its transmit buffer and is waiting for a flow control start signal (for example, XON or CTS).

During a loopback test, data was not received within 1/2 second of when the port sent the data. Check the loopback adapter and the cable (if any).

During a loopback test, the data that was received did not match the data that was sent.

Chapter 5
Troubleshooting

This chapter describes the hardware problems that may be encountered by Computone users, and provides solutions. This chapter covers the following information:

- Common problems
- LED error codes

Common Problems

This section discusses hardware-related problems that may occur with IntelliPort II products. This section covers each problem under a separate heading. Under each heading is a step-by-step list of actions that may resolve the problem.

This section covers the following problems, in order:

- No LED activity on the controller
- System does not boot or reset properly
- Ports appear dead or seem to be receiving garbage

No LED Activity on the Controller

Check the following:

- **Make sure the controller is firmly seated in its slot.**
  - Shut down and power off the host system.
  - Push the controller firmly into the slot and secure the controller with a screw.
- **Move the controller to a different slot.**
  - Shut down and power off the host system.
  - Disconnect any cables from the controller and place the controller in another suitable slot. Reconnect the cables.
  - If you have an EISA or Micro Channel system, you will have to reconfigure the system to correspond to the slot change.
- **Check the IntelliPort II bus cable.**
  - Make sure the bus cable is connected securely. Use the thumbscrews to secure the bus cable and to prevent accidental disconnection.
  - Check the bus cable for obvious damage, including cuts, breaks, or deformation from physical impact. Replace the bus cable if needed.
- **If problems persist, call Computone Technical Support.**

System does not boot or reset properly

The system may boot with the IntelliPort II controller installed, but the system generates a message instructing you to check the status LED on the IntelliPort II controller for an error code. Check the following:

- **Check the status of the controller and of each expansion module.**
  - See "LED Error Codes" later in this chapter for information on controller status.
  - See Chapter 4, "IntelliPort II Expansion Modules" for information on using the LCD Control Panel.
- **Remove the IntelliPort II controller and start the system.**
  - Shut down and power off the host system.
  - Disconnect the bus cable from the IntelliPort II controller and remove the controller.
  - Power on the host system. If the system boots properly, this indicates either an I/O address conflict or a faulty IntelliPort II controller. You can also try moving the IntelliPort II controller to a different slot (see the previous section for details).

    If the system does not boot properly, this indicates a problem with other hardware in the system. Replace the IntelliPort II controller and attach the bus cable. Remove other cards, one at a time, and boot the system until the problem clears.
- **Run system diagnostics.**

  See your system documentation for available diagnostics and their use.
- **If problems persist, call Computone Technical Support.**

Ports Appear Dead or Seem to be Receiving Garbage

Problems with individual ports may be caused by hardware (for example, miswired cables), or incorrect software configuration.

➡ **Note:** Before you can determine whether ports are working, you must first install the software drivers.

This section covers only those port problems caused by hardware. For software troubleshooting, see the manual and release notes that came with your drivers. Check the following:

- **Verify proper cable wiring (all IntelliPort II models).**
  - If the received data looks correct at first, then turns to garbage, this indicates a flow control problem. Make sure the IntelliPort II port and the serial device are set for identical flow control and communication parameters (data rate, parity, etc). Some printers use pins 11 or 20 for flow control.

    If the device does not receive any data at all, this indicates a miswired cable or a flow control problem. If the device is a terminal, make sure you are using a straight-through cable to connect to the IntelliPort II. If the device is a modem, make sure you are using a standard null modem cable. See Chapter 3 for standard wiring diagrams.

- **Run cable tests (standard IntelliPort II).**
  - If you have a standard IntelliPort II, connect a breakout box between the IntelliPort II and the serial device, and watch the signal lights. If the same lights are ON for both sides, you need a cross-over cable. If a different set of lights are ON, try a straight-through cable. Remember that many printers use different pins for flow control.

    If the lights on the cable end of the breakout box do not show all the expected signals, the cable may be damaged or wired incorrectly.

- **Run internal cable tests (IntelliPort II EXpandable only).**
  - If the port is on an IntelliPort II EXpandable, run the Transmit Test diagnostic (see Chapter 4 for instructions). Make sure the port parameters (data rates, parity, and so on) match those of the connected serial device.
  - If the Transmit Test passes, run the Remote Loopback test to verify that the device can send data as well as receive data. (You can skip this step for a printer device.)
  - If the Transmit Test fails, disconnect the serial device and attach a loopback connector to the end of the cable. (If you do not have a loopback connector, you can construct one by connecting pin 2 to pin 3, and pin 4 to pin 5 on a DB-25 connector.) Run the Local Loopback diagnostic (see Chapter 4 for instructions).

    If the Local Loopback diagnostic fails, disconnect the cable, attach the loopback connector directly to the port, and run Local Loopback again. If the test passes, the cable is damaged or wired incorrectly.

- **Verify the integrity of the RS-232 hardware (IntelliPort II EXpandable only).**
  - If the Local Loopback test failed with the loopback plug connected to the port, run the Internal Loopback diagnostic (see Chapter 4 for instructions). If the Internal Loopback diagnostic passes, there may be a problem with the RS-232 driver/receiver hardware inside the expansion module. Call Computone Technical Support for more information.
  - If the Internal Loopback test fails, the IntelliPort II loadware file may be corrupted. Replace the loadware file (see your software manual for the name and location of the loadware file) and run the Internal Loopback test again. If the test still fails, this indicates a problem in the expansion module hardware. Call Computone Technical Support for more information.

- **Check your software configuration.**
  - See the manual and release notes that came with your IntelliPort II software drivers for more serial port troubleshooting tips.

- **If problems persist, call Computone Technical Support.**

"Board Not Found" Message at Startup

A "Board Not Found" message indicates either an I/O address conflict or a problem with the IntelliPort II hardware.

➡ **Note:** Before you can determine whether the IntelliPort II controller can be found by the software drivers, you must first install the software drivers.

- **Check your system configuration for I/O conflicts.**
  - For EISA and Micro Channel controllers, run the configuration program that came with your system and display the configuration for all configured hardware. The Micro Channel configuration program shows conflicts by placing an asterisk (*) next to conflicting peripherals.
  - For ISA controllers, make sure the I/O address DIP switches on the controller correspond to the I/O address you selected (check the Hardware Reference Log in Appendix A). If the switches are set properly, check all peripherals in the system to make sure none of them are attempting to use the same I/O address.
- **If problems persist, call Computone Technical Support.**

LED Error Codes

All IntelliPort II controllers have a tri-color status LED (light emitting diode). You can use this LED to determine whether the controller is operating properly, and if not, what error the controller has detected.

On ISA and EISA controllers, the status LED is visible on the end bracket of the controller without removing the system cover. On Micro Channel controllers, the status LED is on the top edge of the controller; you must remove the system cover to see the LED in Micro Channel systems.

Normal Operation

When power is applied to the host, the IntelliPort II LED should:

- Flash GREEN quickly (controller running memory diagnostics)
- Flash YELLOW slowly (controller waiting for loadware to download)
- Flash YELLOW quickly (driver found, downloading begins)
- Flash GREEN continuously (indicates that first port of controller is open, which implies normal operation).

Error Indicators

If the controller detects a software- or hardware-related problem, the LED continuously repeats a sequence that begins with a RED flash. If you see the LED flash RED, the controller indicates an error number by a sequence of GREEN and YELLOW flashes. Each GREEN flash indicates a value of 10, and each YELLOW flash indicates a value of 1. For example, the controller LED could flash the following error sequence:

RED GREEN GREEN YELLOW YELLOW YELLOW

This indicates error number 23 (two GREEN flashes means 20, three YELLOW flashes means 3). No GREEN flashes indicates an error number of 1 through 9.

➡ **Note:** If the controller encounters any sort of error, write down the error code sequence for future reference.

You can usually resolve error code 3 (bad checksum) by replacing the loadware file with a backup copy (see your software manual for the name and location of the loadware file), and error code 30 (no expansion modules attached) by attaching the expansion modules. Call Computone Technical Support if you see any other error codes.

If the controller encounters a fatal error, it cannot communicate with the host through the FIFO. You must reset the controller (e.g., system power-off, bus reset) to bring the controller out of this condition.

Firmware Error Codes

The controller bootstrap firmware can generate error codes 1 through 5.

Code	Description
1	**Bad FIFO.** Full/empty flags cannot properly track the state of the FIFO; internal registers are bad.
2	**Bad DRAM.** The expansion module's on-board dynamic RAM failed a simple random-pattern test.
3	**Bad Checksum Sensed During Download.** The FIFO may be unreliable or the loadware file may be corrupted. Reinstall the loadware file and reboot the system.
4	**Product ID is invalid.**
5	**Dead UART.** A 1400 UXART is not responding to reset.

If you see error 3, try reinstalling the loadware file (see your software manual for the name and location of the loadware file) before calling Computone Technical Support.

Loadware Error Codes

The controller loadware can generate error codes 6 through 34.

Code	Description
6	**Bad Mailbox.** A FIFO mailbox register failed.
7, 8	Not used.
9	**Invalid Interrupt.** The CPU on the IntelliPort II controller received an unexpected interrupt vector. This may indicate bad DRAM, an internal CPU problem, or a software problem.
10	**Bad First Command From Host.** This error code may appear if: ● The Set Interrupt Level command was not the first command received after writing the loadware ● An invalid interrupt was requested. This may indicate an unreliable FIFO, or a problem with the driver or loadware.
11	**Zero Count Data Packet.** A data packet from the host had a zero count.
12	**Invalid Command Number From Host.** A packet received from the host contained a command number that is out of range (too large). This may indicate an unreliable FIFO or a problem with the driver or loadware.
13	**Bad Synchronous Command From Host.** A synchronous packet received from the host contained a command number that is valid only in a bypass packet, or an unassigned command was sent. This may indicate an unreliable FIFO, or a problem with the driver or loadware.

Code	Description
14	**Internal Software Check.** The `dss_enable()` command was called with one or more illegal arguments. This may indicate bad DRAM or a problem with the loadware.
15	**Empty Data Packet.** A line discipline task received a packet with no data.
16	Not used.
17	**Internal Software Check.** The list of running tasks may be corrupt. This may indicate bad DRAM or a problem with the loadware.
18	**Bad Bypass Command From Host.** A bypass packet received from the host contained a command number that is valid only in a synchronous packet, or an unassigned command was sent. This may indicate an unreliable FIFO, or a problem with the driver or loadware.
19	**Internal Software Check.** Table full; unable to spawn a new process. This may indicate bad DRAM or a problem with the loadware.
20	**Internal Software Check.** The process stack has overflowed. This may indicate bad DRAM, a problem with the loadware, or a problem with the interrupt.
21	**Internal Software Check.** A transmit interrupt was received while processing a send break command. This may indicate a bad 1400 UXART or a problem with the loadware.

Code	Description
22	**Incoming Data or Command Overflow.** The host has sent more commands or data than the controller has room for, in violation of the flow-control credits established between the driver and the loadware. This may indicate an unreliable FIFO, or a problem with the driver or loadware.
23	**Channel Number Too Large.** The host sent a packet to a channel number higher than the maximum channel number for the controller. This may indicate an unreliable FIFO, or a problem with the driver or loadware.
24	Not used.
25	**Unexpected UART Shutdown.** The UART transmitter has shutdown for an unknown reason.
26	Not used.
27	**Stuck Mailbox-Interrupt Bit.** The controller received a (mailbox) interrupt from the host. However, when servicing the interrupt, the mailbox interrupt bit was clear. This may indicate an unreliable FIFO or a problem with the loadware.
28	**Dead UART.** One of the 1400 UXARTs is not responding to a reset. This may indicate a bad 1400 UXART or a problem with the loadware.
29	**Unsupported Product** (Loadware Version 1.0.2 or earlier). Loadware was used on an IntelliPort II EX, but is intended only for the IntelliPort II.
29	**Internal Software Check** (Loadware Version 1.0.3 or higher). Could not start up LCD process.

Code	Description
30	**No Expansion Modules Connected.** No expansion modules are connected to the IntelliPort II EX controller. Shut down the system and connect the expansion modules.
31	**Reserved.** Reserved for development/debugging. If this code appears, it may indicate bad DRAM or a problem with the software.
32	**Invalid Channel Number.** The host sent a packet for a channel that does not exist. This may indicate an unreliable FIFO, or a problem with the driver or loadware.
33	**Bad Buffer Pointer.** A buffer head pointer is not word-aligned.
34	**Bad Buffer Pointer.** A buffer tail pointer is not word-aligned.

Appendix A
Hardware Configuration Log

Use this Hardware Configuration Log to record the configuration of each IntelliPort II controller you install in your system. This information is useful both for future reference and in case you need to call Computone Technical Support.

IntelliPort II Hardware Configuration Log					
Controller	Type (ISA, EISA, MCA)	Slot #	IRQ	I/O Address	Number of ports
1					
2					
3					
4					

Controller	Port Device Names or Numbers
1	
2	
3	
4	

Appendix B
I/O Address Considerations

This appendix covers complete I/O address settings for IntelliPort II EISA and ISA controllers, including ISA controllers installed in EISA systems.

EISA I/O Addresses

The standard EISA configuration assigns I/O addresses to the IntelliPort II based on the slot number in which the controller is installed. The following table lists the default I/O addresses for each slot.

Slot	I/O addresses	Slot	I/O addresses
1	1C88 - 1C97	9	9C88 - 9C97
2	2C88 - 2C97	10	AC88 - AC97
3	3C88 - 3C97	11	BC88 - BC97
4	4C88 - 4C97	12	CC88 - CC97
5	5C88 - 5C97	13	DC88 - DC97
6	6C88 - 6C97	14	EC88 - EC97
7	7C88 - 7C97	15	FC88 - FC97
8	8C88 - 8C97		

A few EISA systems remap these addresses to different slots. If your system is one of these, the IntelliPort II software drivers for the operating system may report that the controller either is not installed or is in the wrong slot. This happens because the software drivers use the standard slot map shown in the preceding table.

To correct this problem, follow these steps:

1. Find the slot address map in the documentation for your computer.

2. Locate the I/O address corresponding to the slot in which you installed the IntelliPort II controller. Write down this I/O address in the Hardware Configuration Log in Appendix A.

3. Find the slot number in the table above that corresponds to the I/O address assigned to your IntelliPort II controller.

4. Configure the IntelliPort II software drivers to look for the controller in the slot determined in the previous step. While this is not actually the slot in which you installed the controller, you can think of it as a virtual slot ID.

ISA I/O Addresses

IntelliPort II ISA controllers use a block of eight DIP switches to set the I/O address. The following table is a short I/O address list that covers the most common switch settings.

I/O Addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
308 - 30F	OFF	OFF	ON	ON	ON	ON	OFF	ON
310 - 317	OFF	OFF	ON	ON	ON	OFF	ON	ON
318 - 31F	OFF	OFF	ON	ON	ON	OFF	OFF	ON
320 - 327	OFF	OFF	ON	ON	OFF	ON	ON	ON

If you are installing an ISA controller in an EISA system, the EISA Configuration program assigns an I/O address, and can optionally display a picture of how you should set the switches. Use the assigned setting unless you have ISA controllers installed in the system that the EISA configuration does not recognize. If this is the case, you will have to verify that the assigned setting does not conflict with other hardware in the system before accepting the assigned I/O address.

> **Important**: Check other hardware installed in your system for I/O address usage before changing the IntelliPort II I/O address.

The following table lists all the I/O addresses and corresponding switch settings for IntelliPort II ISA controllers. You should use this list in the event that you can not map your controller to one of the recommended I/O addresses shown on the previous page.

I/O addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
158-15F	ON	OFF	ON	OFF	ON	OFF	OFF	ON
160-167	ON	OFF	ON	OFF	OFF	ON	ON	ON
168-16F	ON	OFF	ON	OFF	OFF	ON	OFF	ON
170-177	ON	OFF	ON	OFF	OFF	OFF	ON	ON
178-17F	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
180-187	ON	OFF	OFF	ON	ON	ON	ON	ON
188-18F	ON	OFF	OFF	ON	ON	ON	OFF	ON
190-197	ON	OFF	OFF	ON	ON	OFF	ON	ON
198-19F	ON	OFF	OFF	ON	ON	OFF	OFF	ON
1A0-1A7	ON	OFF	OFF	ON	OFF	ON	ON	ON
1A8-1AF	ON	OFF	OFF	ON	OFF	ON	OFF	ON
1B0-1B7	ON	OFF	OFF	ON	OFF	OFF	ON	ON
1B8-1BF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
1C0-1C7	ON	OFF	OFF	OFF	ON	ON	ON	ON
1C8-1CF	ON	OFF	OFF	OFF	ON	ON	OFF	ON
1D0-1D7	ON	OFF	OFF	OFF	ON	OFF	ON	ON
1D8-1DF	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
1E0-1E7	ON	OFF	OFF	OFF	OFF	ON	ON	ON
1E8-1EF	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
208-20F	OFF	ON	ON	ON	ON	ON	OFF	ON
210-217	OFF	ON	ON	ON	ON	OFF	ON	ON
218-21F	OFF	ON	ON	ON	ON	OFF	OFF	ON

I/O addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
220-227 228-22F	OFF OFF	ON ON	ON ON	ON ON	OFF OFF	ON ON	ON OFF	ON ON
230-237 238-23F	OFF OFF	ON ON	ON ON	ON ON	OFF OFF	OFF OFF	ON OFF	ON ON
240-247 248-24F	OFF OFF	ON ON	ON ON	OFF OFF	ON ON	ON ON	ON OFF	ON ON
250-257 258-25F	OFF OFF	ON ON	ON ON	OFF OFF	ON ON	OFF OFF	ON OFF	ON ON
260-267 268-26F	OFF OFF	ON ON	ON ON	OFF OFF	OFF OFF	ON ON	ON OFF	ON ON
270-277	OFF	ON	ON	OFF	OFF	OFF	ON	ON
280-287 288-28F	OFF OFF	ON ON	OFF OFF	ON ON	ON ON	ON ON	ON OFF	ON ON
290-297 298-29F	OFF OFF	ON ON	OFF OFF	ON ON	ON ON	OFF OFF	ON OFF	ON ON
2A0-2A7 2A8-2AF	OFF OFF	ON ON	OFF OFF	ON ON	OFF OFF	ON ON	ON OFF	ON ON
2B0-2B7 2B8-2BF	OFF OFF	ON ON	OFF OFF	ON ON	OFF OFF	OFF OFF	ON OFF	ON ON
2C0-2C7 2C8-2CF	OFF OFF	ON ON	OFF OFF	OFF OFF	ON ON	ON ON	ON OFF	ON ON
2D0-2D7 2D8-2DF	OFF OFF	ON ON	OFF OFF	OFF OFF	ON ON	OFF OFF	ON OFF	ON ON
2E0-2E7 2E8-2EF	OFF OFF	ON ON	OFF OFF	OFF OFF	OFF OFF	ON ON	ON OFF	ON ON

I/O addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
2F0-2F7	OFF	ON	OFF	OFF	OFF	OFF	ON	ON
2F8-2FF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON
300-307	OFF	OFF	ON	ON	ON	ON	ON	ON
308-30F	OFF	OFF	ON	ON	ON	ON	OFF	ON
310-317	OFF	OFF	ON	ON	ON	OFF	ON	ON
318-31F	OFF	OFF	ON	ON	ON	OFF	OFF	ON
320-327	OFF	OFF	ON	ON	OFF	ON	ON	ON
328-32F	OFF	OFF	ON	ON	OFF	ON	OFF	ON
330-337	OFF	OFF	ON	ON	OFF	OFF	ON	ON
338-33F	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
340-347	OFF	OFF	ON	OFF	ON	ON	ON	ON
348-34F	OFF	OFF	ON	OFF	ON	ON	OFF	ON
350-357	OFF	OFF	ON	OFF	ON	OFF	ON	ON
358-35F	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
360-367	OFF	OFF	ON	OFF	OFF	ON	ON	ON
368-36F	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
370-377	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
378-37F	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
380-387	OFF	OFF	OFF	ON	ON	ON	ON	ON
388-38F	OFF	OFF	OFF	ON	ON	ON	OFF	ON
390-397	OFF	OFF	OFF	ON	ON	OFF	ON	ON
398-39F	OFF	OFF	OFF	ON	ON	OFF	OFF	ON
3A0-3A7	OFF	OFF	OFF	ON	OFF	ON	ON	ON
3A8-3AF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON
3B0-3B7	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
3B8-3BF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON

I/O addr.	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
3C0-3C7	OFF	OFF	OFF	OFF	ON	ON	ON	ON
3C8-3CF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
3D0-3D7	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
3D8-3DF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
3E0-3E7	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
3E8-3EF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
3F0-3F7	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
3F8-3FF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

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INTELLIPORT II / INTELLIPORT II EXPANDABLE

MP MASTER

MA25658

COMPUTONE

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